WHAT IS CLAIMED IS:

1. An optical semiconductor module, comprising:

an optical semiconductor element;

a first lens arranged at a position through which a laser beam radiated from the optical semiconductor element is transmitted;

a second lens which is arranged at a position, through which the laser beam transmitted through the first lens is transmitted, and has a laser beam entrance plane which is perpendicular to an optical axis of the optical semiconductor element and is formed in a cylindrical shape; and

an optical fiber arranged at a position at which the laser beam transmitted through the second lens is converged.

2. An optical semiconductor module according to claim 1, wherein an end face of the second lens, from which the laser beam is output, is formed in a flat shape.

3. An optical semiconductor module according to claim 1, wherein an end face of the second lens, from which the laser beam is output, is attached to the optical fiber by using a bonding agent or a welding process.

4. An optical semiconductor module according to claim 3, wherein a refractive index of the second lens differs from a refractive index of a core of the optical fiber by 3 % or less.

5. An optical semiconductor module according to claim 1, wherein a film of a low reflectance for the laser beam having a wavelength of a band of 980 nm is deposited on both the first lens and the second lens, and the optical semiconductor element is formed of a semiconductor laser which oscillates the laser beam at the wavelength of the band of 980 nm.

6. An optical semiconductor module according to claim 1, wherein a periodic diffraction grating is formed in a core of the optical fiber.

7. An optical semiconductor module according to claim 1, wherein a diameter of a core of the optical fiber is enlarged at an end face of the optical fiber on which the laser beam transmitted through the second lens is incident.

8. An optical semiconductor module according to claim 1, wherein a radius of curvature of a convex curved surface of the second lens is equal to 70 μm or less, and a length of the second lens in the optical axis is equal to 210 μm or less.

9. An optical amplifier, comprising:

an optical semiconductor module; and

an erbium doped optical fiber connected with the optical semiconductor module so as to receive a laser beam output from the optical semiconductor module in the optical semiconductor module, wherein the optical semiconductor module comprises

an optical semiconductor element,

a first lens arranged at a position through which the laser beam radiated from the optical semiconductor element is transmitted,

a second lens which is arranged at a position, through which the laser beam transmitted through the first lens is transmitted, and has a laser beam entrance plane which is perpendicular to an optical axis of the optical semiconductor element and is formed in a cylindrical shape, and

an optical fiber arranged at a position at which the laser beam transmitted through the second lens is converged.

10. An optical amplifier, comprising:

an optical semiconductor module; and

an erbium doped optical fiber connected with the optical semiconductor module so as to receive a laser beam output from the optical semiconductor module in the optical semiconductor module through an optical combining and branching unit, wherein the optical semiconductor module comprises

an optical semiconductor element,

a first lens arranged at a position through which the laser beam radiated from the optical semiconductor element is transmitted,

a second lens which is arranged at a position, through which the laser beam transmitted through the first lens is transmitted, and has a laser beam entrance plane which is perpendicular to an optical axis of the optical semiconductor element and is formed in a cylindrical shape, and

an optical fiber arranged at a position at which the laser beam transmitted through the second lens is converged.